

swallow kind do not depart from this island, but lay themselves up in holes and caverns; and do, insect-like and bat-like, come forth at mild times and then retire to their *latebræ*."

So far as I can make out, November 7 is the latest date on which White records having seen swallows. In 1900 I observed them here throughout the month of November—usually not more than from one to three at a time—up to November 30. In 1901 I never saw one after the end of October.

Recent study of migration seems to show that those individuals of a species which breed farthest north are the last to migrate south. But it is hard to believe that these November swallows are those which have bred in the most northern region visited by the species, say, Iceland and the Faroes. How could they have subsisted in those more boreal climes while ours, "foggy, raw and dull," forced them to flee across the seas? I venture to suggest that they are individuals which had already accomplished a part of their southward retreat. They had reached, perhaps, the south of France or Spain. It would be a small matter for such powerful fliers to pop back for a brief interval, tempted by a spell of mild weather. And there is reason to believe that in retiring to their winter quarters many species perform the journey in a much more leisurely fashion than when they make their great rush to their breeding grounds.

G. W. BULMAN.

13 Vicarage Drive, Eastbourne, November 12.

#### THE MYCENÆAN DISCOVERIES IN CRETE.

FOR several years past the attention of archæologists has been directed more and more to Crete. The reasons for this access of interest in the antiquities of the great Mediterranean island have already been explained in the two articles on the "Older Civilisation of Greece," which appeared in NATURE, vol. lxiv. p. 11, and vol. lxvi. p. 390. In Crete, revelations of the older culture of the Greek lands are now being made at a very rapid rate, and it is to Mr. Arthur Evans that the palm for these revelations must be awarded. Through many years of greater or less success he has explored the byways of Crete, convinced that the great island would eventually yield results of the greatest importance for the elucidation of the early history of Mediterranean civilisation, and now he has had his reward in the remarkable discoveries which have attended the systematic excavations which he has at last been able to carry out on the site of the ancient Knossos, the city of Minos himself. It is the excavation of Knossos which has directed public attention to the possibilities of Cretan exploration, and there is no doubt that in importance this excavation ranks far higher than any other in Crete. This being so, it is with Knossos that we may fitly commence our survey of these Cretan explorations. Enough has been said in the two articles previously mentioned to give the reader a general idea of the discoveries at Knossos, and of the peculiar characteristics of the earlier Mycenæan age in Crete—which we ought, perhaps, rather to designate, with Mr. Evans, the "Minoan" age—which have been revealed by these discoveries.

Knossos lies about four miles south of the town of Candia, or Hérakleion, as the Greeks call it. The walk thither is pleasant; the road (a rarity in Crete) resembles any English country lane. In front rises the curious isolated cone of Iuktas, the fabled burial-place of Zeus, which seems steadily to increase in size as we proceed southwards, and at Knossos dominates the surrounding country. Breasting a hill, Iuktas comes into fuller view; on either hand are rolling downs, backed by mountains; further on, a couple of roadside wine-shops, a house, and a path off to the left across the fields to a white patch with a wooden summer-house in the middle of it, from the top of which floats the Union Jack; this is Knossos, where Minos judged, where Theseus slew the Minotaur.

Coming from the west, one enters first the great western court, which, if one is not a timid Dryasdust, but an archæologist who takes pleasure in repeopling the ground on which he stands with those heroic figures which are associated with it in legend, one may call the Dancing-floor of Ariadne if one will. Crossing to the south-west corner, one reaches the remains of a great gate at this end of the beautiful wall of polished gypsum blocks which separates the court from the rest of the palace, and so round through the corridors which once were adorned with frescoes of tribute-bearers coming in procession, into the long north-and-south gallery out of which open to the left the curious long cupboard-rooms or "magazines" in which were stored the great earthenware *pitthoi*, with ornament in relief, containing tablets or other objects of value, which are so characteristic of Minoan palaces. Most of these remain *in situ*, some broken or overturned by falls of masonry, many roughly restored with plaster to keep them together. In the floors open the curious lead-lined safes or receptacles for valuables, called "Kaselais" by the diggers, made with the greatest care in double tiers, and still almost excavator proof. Unluckily, most of the golden treasures which they once contained seem to have been removed before the final catastrophe which overwhelmed the palace of Minos. Over one of these magazines stands the "summer-house" already mentioned, which is really a kind of gazebo, built by Mr. Evans for the purpose of obtaining a panoramic view of the excavations. Hence we pass round to the right, to the throne-room, which opens on to the central court. This is now roofed over, in order to protect its contents from the weather, and the curious brightly-coloured modern Mycenæan pillars, tapering from capital to base, which occupy the site of the ancient columns, with the red-painted walls, give us an interesting idea of what the place once looked like. It should be remembered that there is no "restoration" here; it is purely a work of conservation; the form and colour of the modern pillars are supplied from a Knossian fresco, the colour of the modern walls is but a continuation of the colouring of the ancient. The effect is good. Leaving the throne-room of Minos, with its curious throne with back in the form of an oak-leaf and legs carved with Gothic crockets, its stone seats for the councillors, its bath and its great stone bowl, we cross the central court eastwards to the edge of the hill, and then descend part of the wonderful quadruple staircase, which was excavated by Mr. Evans with so much difficulty and is now held in place by wooden arches, to the "Hall of the Colonnades," in which one might fancy oneself in the court of an Italian palace. Above us is an open loggia, which can be attained from half-way up the stairs. The existing palace is just here nearly three stories high, and was originally four or more! As Mr. Evans points out (*Journal of Hellenic Studies*, xxi. p. 335), "even at Pompeii staircases one over the other have not been brought to light." Passing out, we reach the "Hall of the Double-Axes," so called from its pillars and wall-blocks, which are engraved with the mystic sign of the god of Knossos and of Diktê, who was afterwards (?) identified with the Aryan Zeus. Everybody knows the brilliant philological explanation by Mayer and Kretschmer which has made clear the meaning of *Λαβύρινθος* as "Place of the Double-Axe," and so has converted the guess that the Knossian palace is the Labyrinth itself into a practical certainty.<sup>1</sup> One

<sup>1</sup> In the *Journal of Hellenic Studies*, xxi. part ii. p. 268, Mr. W. H. D. Rouse complains of my having followed Mr. Evans in accepting this explanation of the word "*Λαβύρινθος*" and having adopted his identification of the Knossian palace with the Labyrinth in my book "*The Oldest Civilization of Greece*." Mr. Rouse does not accept the explanation, and so will not adopt the identification. I apprehend, however, that his refusal to accept the explanation of the name is due to the fact that he is hardly cognizant of all the arguments for it. For instance, he says that the termination *-vθos* is not explained! (*loc. cit.* p. 274). He will find it fully explained in

may believe in the existence of the Labyrinth without believing in the existence of an actual Minotaur!

Leaving the Hall of the Double-Axes, we bear round to the left above the little valley of the Kairatos to the ancient northern entrance, where is to be seen a very interesting surface-drain which carried off water from the central court. And now we again stand outside the palace with our faces turned in the direction of Candia.

Looking back, we are at once struck by a feature of Knossos which entirely differentiates it from Tiryns or Mycenæ. It is not fortified. "Bastions" there may be at the northern entrance, but they do not seem to have been of any particular military value. The Labyrinth was not a fortress, it was a peace-time palace, the residence of kings who ruled a settled people and needed not to fear armed attack. But one day war came to Knossos, and the dominion of the proud Minoan thalassocrats disappeared in the smoke of the burning Labyrinth.

This open and unfortified character of the palace testifies to the high state of civilisation of the Minoan Knossians, thus agreeing with all tradition of the great Cretan law-giver who personifies the ancient princes of Knossos. But high civilisation often brings degeneracy in its train, and, as has already been pointed out in these columns (vol. lxvi. p. 393), there are many traits in the culture of Knossos which give the modern observer a decidedly sinister impression.

Of the Mycenaean town of Knossos, excavated by Mr. Hogarth in 1900, which lay to the south-west of the palace, there is not much to be seen. A discovery of Mr. Evans's, made during the present season (1902) and communicated by him to the *Times*, may, however, give us some idea of what the town may have looked like. To quote Mr. Evans:—"This is the remains of a mosaic, consisting of small porcelain plaques, which in its original form seems to have represented scenes disposed in various zones recalling the subjects of Achilles' shield—the walls and houses of a city, a river, a vine and other trees, warriors with bows, spears, and throwing sticks, besiegers and defenders, and various animals. But the most surprising part of all are the houses of which the city is composed. Fragmentary as are their remains, it has been possible to reconstitute about a couple of score of these. The varying character of the structure—stone, timber, and plastered rubble—is accurately reproduced; and the walls, towers, gateways—a whole street of a Minoan city rises before us much as it originally stood. But what is even more surprising than the fact that the elevations of these prehistoric structures should be thus recovered for us intact from the gulfs of time is the altogether modern character of some of their features. Here are three-storeyed houses (some of the semi-detached class showing two contiguous doorways) with windows of four panes, or double windows of three panes each, which seem to show that the inmates of the houses had actually some substitute for glass." Perhaps they had window-glass; why not? It was known to the Romans, and has been found at Pompeii. However this may be, it would indeed seem, as Mr. Evans says, "as if the brilliant and unexpected

character of the finds" at Knossos is "likely to maintain itself to the last."

We retrace our steps to Candia and thence start for Phaistos, on horse- or mule-back. We pass Knossos once more, we pass Iuktas, and so on over the watershed between the Ægean and Libyan seas, with snowy Psiloriti (Ida) on the right hand and Lasíthi (Diktê) on the left, into the Messará, the valley of the Ieropotamos, to the acropolis-hill of Gortyna, which stands at the entrance of a remarkable gorge through which flows the Lethaios of the ancients. The site of this once famous city, which supplanted both Knossos and Phaistos as the chief town of Crete, was investigated by the Italians two or three years ago, and again examined by Mr. Taramelli in 1901; he found no traces of occupation in Mycenaean days. Hence we pass down the broad Messará to the triple acropolis of Phaistos at Agia Photiá, first identified by Admiral Spratt.

Phaistos stands upon a triple-peaked hill, which forms the end of the spur which divides the Messará from the maritime plain of Dhibáki, where the Ieropotamos reaches the sea. At its base runs the Ieropotamos. Its situation is therefore much stronger than that of Knossos, and seems to be better adapted for a fortress than the low knoll on which the Minoan metropolis stood. On the third, the lowest, peak, Prof. Halbherr and the Italian expedition have excavated a Mycenaean palace, the architecture of which is entirely Knossian—Minoan—in type; we find here the same corridors, the same magazines, the same pillared halls and open courts as at Knossos. There is no doubt whatever that the palaces of Knossos and Phaistos were built by the same people and approximately at the same period. Legend ascribes the foundation of Phaistos to Minos, and there is no reason to doubt that this legend enshrines forgotten history. If, then, Phaistos was founded by the Knossians, its palace would be expected to show signs of a somewhat later date than Knossos. These signs are quite apparent. Phaistos marks a development of, an improvement on, Knossos. In some ways it must have been much finer; certainly its ruins are much more impressive. The masonry at Knossos is neither so good nor so well preserved as that at Phaistos; the curious triangular *θεατρικόν* at Phaistos, with its altar and tiers of stone seats, has no parallel in the mother-palace, nor has the latter now anything to compare with the great and broad stairway which leads up to the pillared hall at Phaistos, although it is possible that some similar stairway may once have existed at Knossos, but has now disappeared. Phaistos, then, makes a finer show than Knossos, but is really far less interesting. In the first place, it has no legendary past to speak of; we know nothing of its ancient dynasts, while Knossos was the city of Minos, the metropolis of the ancient dominion over land and sea which is connected with the name of the great legendary lawgiver, and its palace is in all probability the identical Labyrinth which the legendary Dædalus built for the great king. In the second place, Phaistos is nothing but bare walls, fine though their masonry may be, and has yielded practically none of those minor discoveries which tell us so much more than bare walls can; while Knossos, on the other hand, has, as we know, yielded minor discoveries of the utmost importance, which have revealed to us most of our present knowledge of Minoan civilisation and have told us its date.

One difference between Knossos and Phaistos, however, is noticeable, and that a somewhat significant one. Phaistos was more strongly fortified than Knossos, and in many places the palace walls, built of ponderous stones like Mycenæ and Tiryns, are visible. This we should expect in a building which was evidently placed where it is for more or less military reasons, and it confirms the idea that Phaistos was built by the Minoan rulers of Knossos with the direct purpose of controlling

the chapters of Kretschmer's *Einleitung* on the languages of Asia Minor and the pre-Hellenic population of Greece (x., xi., p. 289 ff.; esp. p. 404). I should also like to refer him to my article in *NATURE*, November 14, 1901, Suppl. p. vii., where he will find the matter explained to the best of my ability. With regard to another point which has been urged against the correctness of the identification of the Knossian palace with the Labyrinth as being, *par excellence*, the "Place of the Double-Axe," I confess that I do not see that the fact of the Double-Axe sign being cut upon the rough stone blocks of the walls, which were intended to be covered with stucco or with gypsum slabs, is of much weight, as I am inclined to regard these signs as hieroglyphs, intended merely for the guidance of the masons, signifying that such and such a block was intended for a building or room somehow connected with the worship of the god of the Double-Axe. Indeed, the hieroglyphic of their tutelary deity may have been used by the Minoans as a sort of heraldic device to mark "Government stores," exactly like the British "broad arrow." I do not know whether this explanation will commend itself to Mr. Rouse or not, but it appears natural enough to a student of Egyptology.



the mouth of the Ieropotamos and the more southerly haven of Mátala, and so securing the communications of Knossos with the southern sea. Originally founded by the Knossian princes Phaistos probably was not; such a site must always have been occupied from the earliest days of human settlement in the Messará, and, as a matter of fact, primitive pottery of days long anterior to the Mycenæan period has been found at Phaistos, and in the near neighbourhood is Agios Onouphrios, where one of the most important discoveries in Crete, that of burials of the primitive pre-Mycenæan or "Amorgian" period, containing Egyptian scarabs of the twelfth dynasty (*c.* 2200 B.C.), was made in 1887. But its foundation as an important city Phaistos no doubt owed to the conquering rulers of Knossos, and to them the construction of its fortified palace is most probably due.

This season is announced the discovery at Agia Triadha, between Phaistos and the sea, of what is described as a "country residence" of the Phæstian princes, which will no doubt prove of very great interest. Indeed, it appears that a large number of Mycenæan seals, an inscribed tablet of the Knossian type, and other objects of interest, including a portion of a stone vase sculptured with a most realistic representation in relief of a body of men leaping and dancing in a religious procession (apparently a harvest-home, judging from the implements carried by the dancers), have already been found here. The neighbourhood of Phaistos is rich in remains of the older civilisation of Greece. Northwards, at the end of a valley of Ida, lies the cave of Kamárais, where was found the store of that peculiar pottery which has proved to be characteristic of the period of Cretan art which immediately precedes the true "Mycenæan," the period to which the earliest foundation of the palaces both of Knossos and of Phaistos must be assigned, the period, probably, of the earliest Minoan kings. A large store of this ware was discovered by Mr. Hogarth in the town of Knossos, and it has also been found at Phaistos, Zakro and other Minoan sites. Further, and this is most interesting, it was also found by Prof. Petrie at Kahun, in Egypt, and may there be roughly dated to the period between the twelfth and eighteenth dynasties, not earlier than the twelfth, but no doubt earlier than the eighteenth. It was, then, imported into Egypt from Crete between 2000 and 1700 B.C. Here is another piece of evidence as to date which fits in absolutely with the evidence of the alabastron-lid of Khyan and the statuette of Ábnub, found at Knossos.<sup>1</sup> Everything points to *c.* 2000-1500 B.C. as the date to be assigned to the early Minoan period.

The other well-known cave on Mount Ida, the "Idæan Cave" *par excellence*, explored by Messrs. Halbherr and Orsi, contained objects, mostly of post-Mycenæan and early classical date, exhibiting strong traces of Phœnician influence. It lies further north, above the Nida plain.

To the south-east, in the direction of Gortyna, stood once a Mycenæan city on the curious isolated hill of Kourtais, the necropolis of which has yielded interesting Late-Mycenæan and Geometrical finds. Another explored site which may be mentioned is Priniá, to the north; away to the east, in the province of Pediada, where the Omphalian Plain meets the lofty mountains of Lasithi, the ancient Diktê, and the as yet unexplored site of Lyttos awaits the excavator's spade, the necropolis of Erganos has yielded the interesting tombs of a Mycenæan hill-settlement, and the district of Embaros innumerable traces of extensive occupation in Mycenæan times, both early and late. This country must in Minoan days have formed part of the immediate territory of Knossos; the town of Lykastos, which lay within it, was said to have been founded by

Minos, and Lyttos is associated with the legends of the Cretan Zeus, who was supposed to have passed his childhood in a cave on the slopes of Diktê. This cave has been identified, and Mr. Hogarth has explored it. It is a "large double cavern situated to south-west of, and about 500 feet higher than Psychro, a village of the upland Lasithi plain," a curious tract which lies in the middle of and surrounded by the Dictæan mountains. Mr. Hogarth's discoveries in the Dictæan Cave have already been noticed in NATURE (vol. lxiv. p. 15); it need only be said here that he has shown that it was probably one of the holiest places of Crete, and the hundreds of Mycenæan votive double-axes which he found are final proof of the identity of the prehistoric God of the Double-Axe with the Cretan Zeus, which again shows the identity of the Cretan with the Karian Zeus, whose emblem was the  $\lambda\acute{\alpha}\beta\rho\upsilon\varsigma$  or Double-Axe and the seat of whose worship was Labraunda, which confirms the equation  $\lambda\acute{\alpha}\beta\rho\alpha\nu-\nu\delta\alpha = \lambda\acute{\alpha}\beta\rho\upsilon\tau\iota-\nu\theta\omicron\varsigma$ , explains  $\lambda\acute{\alpha}\beta\rho\upsilon\nu\theta\omicron\varsigma$  as the "Place of the Double-Axe," and so identifies the Knossian palace as the Labyrinth of Minos. Most interesting is the discovery in the Dictæan Cave of a bronze figure of the Egyptian God Amen-Râ, Amonrasoter, "the King of the Gods," probably dating to about the eleventh or tenth centuries B.C., which was perhaps dedicated by some Egyptian traveller who identified the God of the Double-Axe with his own supreme deity, thus anticipating the later conjunction Zeus-Ammon by many hundred years! From this cave came the well-known inscribed libation-table, now in the Ashmolean Museum. It was no doubt from Diktê that the Cretan mountain-goddess Diktyнна, also called Britomartis, took her name, and not from the Greek  $\delta\acute{\iota}\kappa\tau\upsilon\omicron\nu\nu$ , "a net."<sup>1</sup>

South-west of Diktê is a district in which many Mycenæan sites still await the spade, as at Rotási (Rhytion) and Viano (Biennos); on the south coast is Arvi, where, a few years ago, an important find of early Mycenæan stone vases was made, and where an ancient cult of Zeus probably points to a direct connection with Knossos.

Rounding the northern slopes of Diktê, we enter the province of Mirabello, where, at Milato on the north coast, an important Mycenæan tomb has been found, and where, further south, the imposing ruins of Goulàs, the ancient Lato, investigated by Messrs. Evans and Myres and afterwards partly excavated by a French explorer, M. de Margne, without much success, no doubt mark the site of a Minoan city and palace. The place-name Minoa preserved in classical days the tradition of Knossian domination hereabouts also. We have now reached another depression in the mountain-system of Crete, the hilly plain which lies between the Gulf of Mirabello and the district of Hierapytna on the south coast. Before us to the east rises another mountain-mass, which stretches from sea to sea and seems to block all further progress eastward. This is the Aphenidi Vouno of Kavousi, which bars off from the rest of Crete the extreme eastern portion of the island, the modern province of Sitía, of old the territory of the Eteokretans, who were said to be first cousins of the non-Aryan Lycians, and certainly still spoke an absolutely non-Greek idiom even in classical times. In the Eteokretan country itself we find little proof of Minoan occupation except here and there on the coast, so it is probable that direct Knossian control in Minoan times ended with the Hierapytnian territory. The most easterly Minoan town in this district appears to be that discovered in 1901 by Miss Harriet Boyd at Gournia, on the Gulf of Mirabello, at the foot of the Aphenidi, and nearly opposite the island of Psyra. In the same neighbourhood, at Kavousi, Miss Boyd had made fruitful excavations in the preceding year, but her discoveries at Gournia far

<sup>1</sup> See NATURE, vol. lxvi. p. 392. The identification of the Kahun ware with that of Kamárais is due to Mr. J. L. Myres.

<sup>1</sup> See "The Oldest Civilization of Greece," p. 296, where I have explained the form of the name.

exceed these in interest, and are of such great importance that the following short description of them, taken from the *American Journal of Archaeology* for January-March of this year, p. 71, is here quoted:—"A Mycenæan acropolis was found, approached by two long streets, about 5 feet wide, with terra-cotta gutters and good stone pavements. These lead to the palace of the Prince. Right and left are side streets and houses. The steeper parts of the roads are built in steps. The houses have rubble foundations, but the upper walls are of brick. In some parts of the palace the upper walls are of ashlar. Several houses have walls standing to the height of 6 or 8 feet. Plaster is used extensively for the facing of walls and door jambs. There are many proofs of the existence of a second story. Twelve houses have been excavated, most of which have eight rooms or more. Of the palace, fourteen rooms have been excavated, chiefly magazines, like those at Knossos. A terrace court, a column base, and an aula, evidently belonging to a portal, have been uncovered. In the centre of the town is a shrine. It is a small, rectangular building, near the top of the hill. The most noteworthy of its contents are a low terra-cotta table, with three legs, which possibly served as an altar; cultus vases with symbols of Mycenæan worship; the disk, 'consecrated horns of the altar' [see NATURE, November 14, 1901, Suppl. p. vii.], and the double-headed Axe; and a terra-cotta idol of the 'Glaukopis Athene' type, with snakes as attributes. . . ." The smaller objects found are of the usual Mycenæan type, including stone and bronze utensils. Very significant is the fact that the Double-Axe is found painted on vases, and carved also on one of the stone blocks of the palace, as at Knossos and at Phaistos. This marks the place as Minoan at once. Very possibly it was the frontier-town of the Knossian dominion on the Eteokretan border. It is "the most perfect example yet discovered of a small Mycenæan town." In fact, a Minoan Pompeii on a small scale!

Beyond the Aphenidi Kavousi we are in the province of Sitia. On the site of the ancient Eteokretan capital, Praisos, excavations have been carried on by Prof. Halbherr and by Mr. R. C. Bosanquet, the present director of the British School at Athens. Here a few remains of Mycenæan culture were found by Mr. Bosanquet, including a large "beehive" tomb. Another inscription in the non-Hellenic tongue of the Eteokretans<sup>1</sup> was discovered, of course, of a date long posterior to the Mycenæan period!

Mr. Bosanquet has also excavated at Petras, a place on the harbour of Sitia, and, during the present year, at Palaiokastro, on the east coast, south of Cape Sidero, where he has found some very curious Mycenæan interments. Palaiokastro is, I am informed by Mr. Bosanquet, bigger and more important, as a site, than Gournia and Zakro, but more disturbed by cultivation. As a Mycenæan settlement, it is quite as noticeable as Zakro; a remarkable characteristic is the occurrence, dotted all over the plain, of the foundations of Mycenæan farmsteads, on which Mr. Bosanquet lays stress, as a fresh proof of the peaceful security enjoyed by the Mycenæan Cretans. Further south again, at Zakro (which Spratt considered to be the site of Itanos, but probably erroneously, since Erimopoli, north of Palaiokastro, has a better claim to this honour), Mr. Hogarth has discovered the remains of an important Mycenæan port-town, which, he thinks, was a Minoan outpost, a

Knossian colony planted here to hold the most important haven on the east coast, which is still used by the sponge-fishers, who make it their rendezvous before starting for the African coast. Mr. Hogarth's discoveries here have been more fully referred to in the last volume of NATURE, p. 394, *q.v.*

We thus see that the main result of the excavations on Mycenæan sites in Crete which have been going on for the past two or three years has been the proof of the existence in the great Mediterranean island of a civilisation which was already ancient and highly developed at least as early as 1700 B.C., and was in connection with Egypt at that date and probably earlier. The origin of this culture is at present veiled from us; but various strange indications of a primeval connection with Egypt seem to point to *Africa* for its origin. More than this cannot be conjectured at present. Its centre seems to have been the central portion of Crete, the territory of Knossos and Phaistos, which is inextricably bound up with the famous legends of Minos and the Knossian thalassocracy. Mr. Evans's discoveries have breathed life into these legends, and though we may not believe in Minos as a historical personage, at any rate we see that he represents a dynasty and a power, and so we can speak of the Minoan dominion in Crete and of the Mycenæan civilisation of Crete, the chief monuments of which are at Knossos and Phaistos, as "Minoan."

The Knossian dominion extended in the east apparently as far as the borders of the independent Eteokretan country. One or two Knossian colonies seem to have been established on its further coast, such as Palaiokastro and Zakro. Similar Minoan colonies seem to have been also established in other islands of the Ægean, as in Melos, at Phylakopí. That we have here a confirmation of the legend of the Minoan thalassocracy there can be little doubt.

How far the Knossian dominion extended westward is as yet unknown. Axos, which lies at the upper end of the Mylopotamo valley at no great distance from the Knossian district, is now being excavated, but has as yet yielded nothing Mycenæan. There can, however, be little doubt that it was a Minoan city. I have elsewhere<sup>1</sup> suggested that the *Uashasha*, who invaded Egypt in concert with other Mediterranean tribes in the reign of Rameses III., probably some three hundred years after the most flourishing period of the Minoan age, were Cretans from Axos, and have given my reasons for the suggested identification. The objection that Axos is an inland town and so would not have taken part in an over-sea expedition is of no weight whatever; like Knossos, Lyttos, or Gortyna, each of which cities possessed a dependant port on the coast, Axos no doubt possessed its coast-haven, either in the neighbourhood of Bali Bay or nearer the mouth of the Mylopotamo. Further, Axos is actually connected in legend with Libya, and Herodotos (iv, 154) mentions traditions which connect it, as well as Itanos, with the Theræan colonisation of Cyrene. Other central and western sites, such as Eleutherna, Hyrtakina, Phalasarna, &c., will no doubt yield Mycenæan remains when excavated. In fact, the whole of Crete seems to be covered with traces of Mycenæan culture; I have not mentioned numbers of unexcavated sites from which inscribed seal-stones, &c., have been obtained.

The Minoan culture was probably older than the Mycenæan civilisation of continental Greece, and there seems little doubt that the original inspiration of the latter was derived from it.

Eventually the highly civilised and apparently peaceful Minoan dominion in Crete, weakened, perhaps, by luxury and unused to war, was overthrown by foreign attack. Who the conquerors were we do not know, but they probably came from the north. We may, perhaps, associate with their attack the convulsions among the

<sup>1</sup> I must here state that in "The Oldest Civilization of Greece," p. 87, I had not the remotest intention of attributing to Mr. Arthur Evans the opinion that the well-known Inscription of Praisos was inscribed in a Semitic idiom. I was fully aware that he held no such view. I merely referred to his "Cretan Pictographs" as the latest authority on the subject generally. Unluckily, the small number pointing to the note below, containing this reference, was misplaced in the text. It was printed after the word "Eteokretans," but should have come after "Praisos," four lines above. I regret that this escaped my notice when reading the proofs of my book, and still more that the nature of the mistake was not understood.

<sup>1</sup> "Oldest Civilization of Greece," p. 177.



Mediterranean tribes which caused the piratical onslaughts on Egypt in the thirteenth and twelfth centuries B.C., in which Cretan wanderers, expelled from their island by the northern newcomers, may well have taken part. It is certain that before this time the highly civilised Minoan Cretans or *Keftiu* had disappeared from the ken of the Egyptians, and are no more seen in Egyptian wall-paintings. One result of this convulsion seems to have been the settlement of a Cretan tribe, the Philistines, on the coast of Palestine.

When Crete emerges from the dark age which followed the break-up of the Minoan power, we find it a congeries of Greek city-states of the usual type, but of a more quarrelsome disposition than elsewhere; in the Minoan land itself, Gortyna conquers and destroys Knossos and Phaistos, in the east Hierapytna wages long wars with Praisos and Itanos, and so forth. Crete takes no part in the colonising activity of the new Greece, and is henceforth of no account in Hellas. Her day of glory had passed away with the Heroic age.

I am indebted to Mr. R. C. Bosanquet for information with regard to the work of the British School at Athens in eastern Crete. Subscriptions for this work will be gladly received by Mr. Walter Leaf, 6 Sussex Place, Regent's Park, N.W.

H. R. HALL.

P.S.—Photographs of the remains at Hyrtakina have been published by Messrs. Savignoni and De Sanctis in their publication "Esplorazione Archeologica delle Provincie Occidentali di Creta" (Rome, 1901). From their publication it would appear that Phalasarna, the most westerly site in the island, was certainly of Mycenaean origin. Near the remains of a city is a colossal stone throne, of the same type as those treated of by the late Dr. Reichel in his "Vorhellenische Götterkulte," on which is a relief of a symbolic pillar (see Evans, "Mycenaean Tree and Pillar-Cults," in the *Journal of Hellenic Studies*, vol. xxi. p. 99 ff.; reviewed in *NATURE*, November 14, 1901, Suppl.). The name Phalasarna is of the now easily recognisable "kleinasiatisch" prae-Hellenic type. Kretschmer has pointed out that the last two syllables may well be the same as the name of the Boeotian Arnê, which he has identified with the Lycian word *arîna*, "city" ("Einleitung in die Geschichte der griechischen Sprache," p. 406). There seem to be Mycenaean traces also at Vlithiàs and at Agia Irene (Kantanos?); see Savignoni and De Sanctis, *loc. cit.*, for photographs of polygonal masonry, &c.

Mr. Bosanquet informs me that he has found Mycenaean pottery-fragments on the small island of Mókhllos (wrongly called Hagios Nikólaos in Kiepert's map of 1897), off the north coast between Kavousi and Sitia.

#### THE SECOND INSTALMENT OF THE BEN NEVIS OBSERVATIONS.<sup>1</sup>

THE forty-second volume of the *Transactions* of the Royal Society of Edinburgh is devoted to the publication of five years' observations at the Ben Nevis Observatories, in continuation of those included in vol. xxxiv. of the same series of *Transactions* published in 1890, with appendices consisting of discussions of the results. It is edited by Dr. Buchan, the meteorological secretary to the directors of the observatories, and Mr. R. T. Omond, honorary superintendent of the observatories. The cost of printing is borne by the Royal Societies of London and Edinburgh. The observations include hourly readings and summaries

of the meteorological elements, together with entries in the log-book at the summit station for the five years 1888-1892, and readings, five times daily, at the public school, Fort William, from January, 1888, to December, 1890; also the hourly readings with various summaries for the Fort William Observatory from the establishment of that institution in the autumn of 1900. There have also been added tables of mean hourly values of the barometer, temperature, &c., at Ben Nevis and Fort William Observatories, computed to the end of 1896, with mean monthly temperatures deduced from independent observations in the Stevenson screen at Fort William for the period August 1, 1890, to December 31, 1896, and differences between the observations in the Stevenson screen and the thermograph screen of the Observatory. It is almost needless to say that the publication of these tables will be welcomed as representing the primary results of an enormous amount of patient and painstaking labour, controlled by a representative board of directors of conspicuous distinction and carried out by a body of enthusiastic observers in circumstances of no little difficulty.

This is not a suitable occasion for dealing independently with the observations, which are presented with the skill and care of which Dr. Buchan is an acknowledged master, and with all the assistance an accomplished printer can afford. We naturally turn to the appendices as representing the scientific results which have been obtained by those who have been associated with the working of the observatories and have devoted time and study to the many problems which the observations suggest.

The appendices consist of a series of papers, some of them *in extenso* and appearing now for the first time, others in abstract or reproduced from the publications of the Royal Society of Edinburgh or the Scottish Meteorological Society by Dr. Buchan, Mr. Aitken, Mr. Buchanan, Mr. Omond, Mr. Mossman and Mr. Rankin.

A brief survey of these discussions is sufficient to show that the problems suggested by the meteorology of Ben Nevis, taken separately or in comparison with that of Fort William, are many and difficult. Dr. Buchan returns to a voluminous but still unexhausted subject in a paper on the diurnal range of the barometer in fine and cloudy weather at stations in various latitudes, from San José, Costa Rica, to Jan Mayen in the North Atlantic. Mr. Aitken's report on atmospheric dust and Mr. Buchanan's discussion of the meteorology of a station in the clouds, as represented by the Ben Nevis records in foggy weather, are already well known contributions to science. The other papers are, as a rule, of less general scope.

Much attention is devoted to the relation of barometric readings at the summit to those at the base station, and here one of the difficulties of Ben Nevis observations becomes very conspicuous. When the velocity of wind reaches or exceeds twenty miles per hour, the barometer reading at the summit no longer represents the pressure of the air within 0.01 inch. All barometric readings with anything more than a moderate wind are subject to a correction of uncertain amount on account of dynamical disturbance. Moreover, the shape of the mountain, with its great cliff on one side of the summit, has a very marked effect upon the wind measures. This circumstance reminds me of a personal experience at Dover during a gale, when the only place in Dover screened from the wind was the top walk of the Admiralty pier, apparently as fully exposed to the gale as any position could be. Such dynamical effects upon barometer and wind make it very difficult to bring the summit observations of these primary meteorological factors into relation with corresponding observations elsewhere.

These are not the only difficulties associated with the reduction of the summit barometer readings to sea level, and the account of the attempts to carry out this reduction

<sup>1</sup> "The Meteorology of the Ben Nevis Observatories." Part ii., containing the Observations for the Years 1888, 1889, 1890, 1891 and 1892, with Appendices. Edited by Alexander Buchan, LL.D., F.R.S., and Robert Trail Omond.